Kraft Foods Takes TQM Approach to Select Multi-site Research Grade LIMS

The labs need LIMS for high volume standard testing and unique research problems.

By Brad Burns

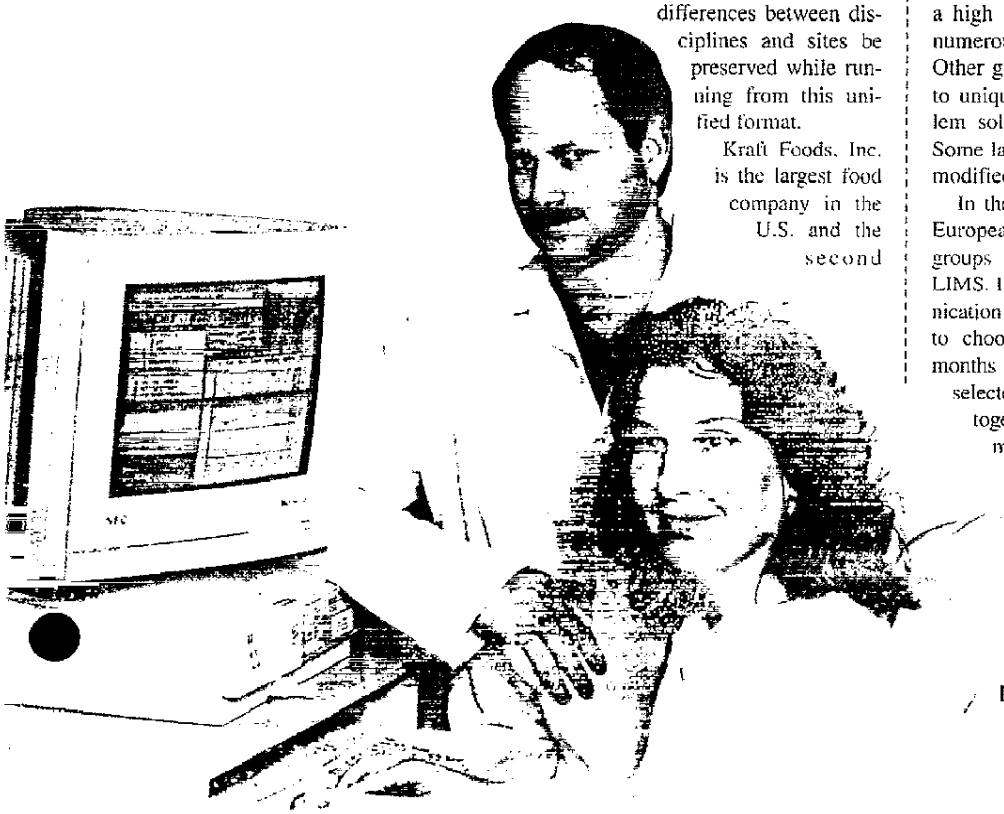
Introduction

Recently, Kraft Foods, Inc. partnered with LabWare, Inc. (Wilmington, DE) to develop a LIMS suitable for the research environment. This LIMS had to support analytical chemistry and microbiology research distributed across several sites in North America. The data structure was to be the same since the database and other software would run from a single server. It was crucial that differences between disciplines and sites be preserved while running from this unified format.

Kraft Foods, Inc. is the largest food company in the U.S. and the second largest food company in the world. Analytical chemistry and microbiology research support for Kraft Foods is located in several sites in North America. Each department operates as a single unit, managing resources and projects across multiple sites. In addition, analytical chemistry research exists in other sites in Europe and Asia-Pacific.

The largest labs involve a diverse mixture of work from chemical to physical and apply themselves against almost all aspects of KF Research. They handle a high volume of standard testing and numerous, unique research problems. Other groups are smaller and dedicated to unique research problems and problem solving for their local customers. Some labs work principally on new and modified product launches.

In the selection, the North American, European, and Asia-Pacific analytical groups were free to choose their own LIMS. In other words, there was communication among the groups but no mandate to choose the same vendor. After 18 months of searching, the three regions selected the same LIMS vendor. Taken together there were six LIMS implemented in calendar year 1995. This article describes the actions and activities of analytical chemistry and microbiology research for Kraft Foods North America and



Agency chemists, Lee Press and Mike Locus, were an integral part of the TQM approach to LIMS implementation at Kraft.

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does not discuss the QC laboratories or their LIMS needs; nor does it discuss the specifics of the European or Asia-Pacific implementations.

The Existing Situation

In 1993, there were several dissimilar LIMS running on unrelated platforms, with incompatible operating systems. Not everyone within a site was using LIMS and communication between LIMS was not possible. All LIMS were restricted to one-dimensional data with no opportunity to link to chromatography systems or micrographs. Only one lab had clients performing sample log in.

The largest analytical group was the first to start looking for a LIMS. Not surprisingly, they had the most experience with LIMS systems having implemented three - the first in 1983 was written in-house and ran on a Hewlett Packard 1000, the second was a Digital Equipment Corporation LIMS-SM in 1991, and the third was a heavily modified version of DEC LIMS-SM in 1993.

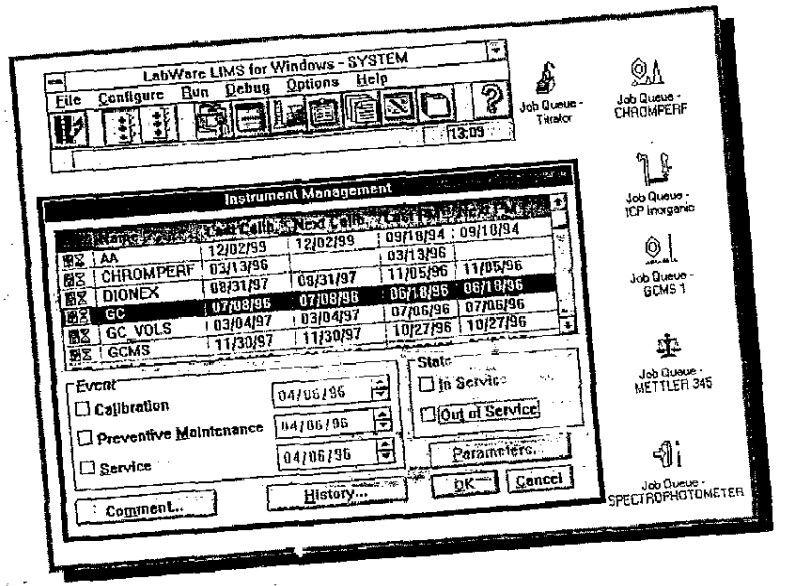
Within months of the third implementation. Digital Equipment Corporation announced they were phasing out support for their LIMS product and would no longer support their LIMS customers, beginning in January 1996. At the time only Analytical was fully using the LIMS. Microbiology, being a smaller group, could not compete for the limited computing resources required to modify and manage the LIMS. As a result, Microbiology was using only a small part of the functionality with most of their operation being limited to notebooks and paper.

In other locations, the situation was similar; the HP LABSAM was used by only a fraction of the groups. No one in Microbiology was involved. A two-person group at one site was typical of this partial usage: they used the LIMS to track consumer complaint information but were led by a dedicated computer specialist with analytical training.

Only one group was satisfied at all. They had a DOS LIMS with links to Lotus 1-2-3 spreadsheets. The systems was as up-to-date as DOS would permit a LIMS to go.

Technology Review

After reviewing many of the LIMS systems available and learning computer vernacular, we decided that client-server was the right approach for us. We wanted hardware and database independence so as not to be tied to a single supplier. Finally we wanted MS Windows as our operating system because we wanted it to integrate with the MS Office suit of software applications that our users and clients were already familiar with.



Example screen showing instrument integration with Labware LIMS.

The decision was a difficult one. It involved a team of people from different time zones, multiple locations and very different corporate cultures. These people wanted the same thing, to do the right thing for the company, but they approached it in their own way, shaped by their individual experiences and risk profiles. Since all LIMS sales people claim their LIMS will do everything, we decided not to focus on features but to define differences in how those features were delivered. Eventually we developed a list of about 25 important differences and scored each vendor's approach.

Implementation and Results

Our implementation plan began in the largest lab. The Microbiology, Analytical and Systems groups formed a site core team to oversee the work and we hired a consultant through LabWare to develop a plan and timetable. Throughout the process we challenged our people to scrutinize their processes, question why they did things the way they did them, and prepare a "wish list" for LIMS performance that would exceed anything they had known to date. We used a Total Quality Management (TQM) approach and involved everyone down to the technicians and administrative assistants in redesigning our process. Just this phase alone, which took about a month at each site, was an extremely valuable exercise. What we learned was that the creativity of our people far exceeded the boundaries of our current procedures and practices. For example, the list of specifications we created and sent to LabWare initially was exceeded by 300 percent by the time our people redesigned the processes themselves.

The implementation at the larger group preceded the other groups by three months. The phase shift allowed those who had less experience with a LIMS to learn from the others' experience. It also gave these sites time to focus on other aspects of the process like developing a link between LabWare LIMS and Perkin-Elmer Turbochrom. This turned out to be the method of choice for setting up sequence files and doing other labor intensive and somewhat redundant chores chromatographers have to do. Additionally, we developed electronic links to our internal project tracking system. Finally, we developed dynamic links to a Kraft product information table.

The implementation took about a year from beginning to end. It helped bring our groups closer, personally and professionally. We made ourselves computing technology leaders within the company. The

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struggles and triumphs of this process have made us a technically stronger group, with better communication, and gave us an understanding of how to turn a vision and into reality.

The Next Steps

The implementation is not over, we are still fine tuning our system but the flexibility we asked for is being used. We are implementing Windows NT-client and will be able to do this without any modification to our LIMS. Since LabWare LIMS is built on the 32-bit architecture it will, in fact, run better on NT. Although one group is still running their DOS LIMS, they will begin to move to LabWare in the near future. The group in Europe is at about the same stage as the rest of us in the US.. North America will probably adopt some of their client interface. The Asia-Pacific group will be operational soon.

Conclusion

We feel good about our technology decisions. We think the current trends prove we were ahead of the market and believe we have the best LIMS on the planet or at least something close. Our people's involvement was the key. We are satisfied that we can stay on the leading edge of computing technology, migrate our LIMS to new platforms, and link to new systems as they develop.

Our flexible environment integrates the LIMS with other powerful computing tools and gives us the ability to deliver key learnings to our customers. The delivery of results and understandings to our customers in formats that they find useful is the biggest difference between this and previous LIMS systems. It is the learnings from the data, not the data itself that helps our customers deliver competitive advantage.

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LabWare, Inc.
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